WHAT IS LOGICAL SYNTAX?

By DANIEL J. BRONSTEIN

IN this paper I want to apply the *method* of logical syntax (analysis) to Carnap's *doctrines* of logical syntax in order to bring about a clarification of those doctrines. The principal instrument of my analysis will be Peirce's theory of signs.

According to Carnap, logical syntax is a *formal* theory which sets forth the rules for the construction of sentences, and for their transformation into other sentences. The analysis of the structure of these rules is termed the method of logical syntax, and is said to be the only correct method of philosophy.

Sentences are divided into object-sentences and syntactical sentences. The former concern objects, while the latter are about words (and sentences, etc.). Of course, there is a sense in which syntactical sentences are object-sentences, i.e. sentences about the objects of syntax, as Carnap points out,[1] but he makes the distinction between sentences about non-linguistic objects (real object-sentences) and sentences about the objects of logic (syntactical sentences). There is also a third class of sentences that seem to be about real objects but are really only about words or combination of words. They are in reality syntactical sentences, but are masked as object-sentences ; these are called

[1] Logische Syntax der Sprache, p. 203.

pseudo-object-sentences. They are said to be in *the material mode of speech* ; they can be unmasked and shown to be syntactical by translating them into the *formal mode of speech*. While sentences in the natural sciences are object-sentences, and sentences in logic and grammar are syntactical, most *philosophical* sentences are pseudo-object-sentences. *Philosophical* sentences that seem to be about objects, such as " the structure of space and time, the relation between cause and effect, the relation between things and their qualities, the difference and the real relations between the physical and the psychical, the character of numbers and numerical functions, the necessity, contingency, possibility or impossibility of conditions, and the like " are not about these objects at all, but " really concern linguistic forms."[2]

When Carnap speaks of *the formal mode of speech*, and when he says that logical syntax is a *formal* theory, it is of some importance, if we are to understand him, to know what he means by " formal." He says :

> " We will call " *formal* " such considerations or assertions concerning linguistic expressions as are without any reference to sense or meaning. A formal investigation of a certain sentence does not concern the sense of that sentence or the meaning of the single words, but only the kinds of words and the order in which they follow one another."[3]

What does Carnap mean in this quotation by " linguistic expressions that are without any reference to sense or meaning ? "

There are at least two distinct ways in which the word " word " can be used. (1) It may mean the physical shape in a given place, or the physical sound which occurs at a definite time. This is what Peirce calls a *sinsign*. In this meaning of the word " word," the word " sense " occurs twice in the above quotation from Carnap. (2) It may mean not a single object but a type, which has instances, or a meaning which is exhibited by vehicles. This is called by Peirce a *legisign*, and the instances or vehicles

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[2] Philosophy and Logical Syntax, p. 59–60.
[3] Ibid. p. 39.

are called its *replicas*. These *replicas* are *sinsigns*. In this meaning of the word "word" there is only one word "sense" in the quotation from Carnap.

Implicit in all Carnap's arguments on the nature of logical syntax is the assumption that since *philosophical* and also *mathematical* sentences can be shown to be *about* words or other designations, all reference to *objects* designated by these words is thereby eliminated ; hence questions concerning the objects signified by signs which are the subject matter of philosophy are futile. This assumption is crucial ; it is plausible only if the signs with which philosophy is concerned are *sinsigns*. I say *plausible*, because I do not think it is justified even in that case. But if the signs in question are legisigns, then the assumption is not even plausible. For a legisign is a type or law which can never be written down or pronounced ; what is written down or pronounced is a particular instance of it, a *sinsign*. Now since a sinsign is a particular shape or noise and also an instance of a legisign, statements may concern it simply as a shape or noise, or they may concern it as instance of a legisign. Reference to the *object* is not implicit in the former case but it is in the latter. But when we make assertions *about* a legisign (which is a *symbol*), we are *ipso facto* saying something about its objects, the thing symbolized.

Carnap's definition of " *the formal mode of speech* " gives no clear indication whether that *mode* concerns *words* and *linguistic expressions qua sinsigns* or *qua legisigns*. Apparently he conceives the *formal mode* to be about *sinsigns* since he uses the phrase " linguistic expressions that are without any reference to sense or meaning." But the illustrations he uses require the formal mode of speech to be concerned with *legisigns*. I propose to show, by considering the illustrations used by Carnap, that translations from the material mode of speech (pseudo-object-sentences) into the formal mode (syntactical sentences) are inadequate unless the formal mode concerns linguistic expressions *qua legisigns*. From this, some interesting consequences follow concerning the validity of Carnap's theses that (1) the problems of philosophy are either pseudo-problems or problems of logical

syntax, i.e. that they are concerned with words and other designations but not with the things designated: (2) the resulting anti-metaphysical position, and even (3) the doctrine of physicalism (which depends on the translation of sentences in a given language into *equipollent* sentences of *the language of physics*.) All these doctrines hinge on the meaning that is assigned whether *sinsign* or *legisign* to such terms as " word," " sentence," and the like.

1. As our first illustration let us consider Carnap's example of the pseudo-object-sentence, S_1 : " The first chapter treats of metaphysics," which he translates into the syntactical sentence (formal mode), S_2 : " The first chapter contains the word ' metaphysics ' ". S_1, the argument runs, seems to be an object sentence about a certain object *metaphysics*. But it really is not, for the translation shows that it is only about the word ' metaphysics.' Now if S_2 means : " The first chapter contains the sinsign ' metaphysics ' ", then the translation is incorrect. For the first chapter might contain the sinsign " metaphysics " without treating of metaphysics (if it were a philological treatise or a thesaurus) and it might treat of metaphysics without containing the word (sinsign), e.g. if it were one of the books in Aristotle's *Metaphysics*. But when Carnap modifies S_2 to read S_3 : " The first chapter contains the word ' metaphysics ' or some synonym," it is clear that he means " The first chapter contains the legisign ' metaphysics ' ".[4]

2. Consider next the pseudo-object-sentence :

S_1 : The rose is a thing

which is translated into the formal mode by

S_2 : The word ' rose ' is a thing-word

S_2 is not about the sinsign ' rose ' but about the legisign. Hence

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[4] Even this translation is not adequate, since a metaphysical chapter might easily contain no synonym of ' metaphysics.' To obtain an adequate translation we should have to enumerate all the legisigns that have occurred or could occur in a chapter which treats of metaphysics, and then say : " The first chapter contains at least one legisign from this class." Whether or not this class can be *constructed* is a debatable question. I stress the difficulty of adequate translations of pseudo-object-sentences in this and the following examples because I wish to show that the manner of translation employed by Carnap for pseudo-object-sentences is equally suitable (or unsuitable) to real-object-sentences.

it means " The legisign ' rose ' is a rhematic symbol '.[5] The nature of the sentence S2 should be contrasted with a sentence that is about the sinsign ' rose,' e.g. " The word ' rose ' is a one syllable word," or " The word ' rose ' is misprinted on page 209," or " The word ' rose ' has four letters " etc.

Since pseudo-object-sentences, when translated into *the formal mode of speech* are *about* legisigns, and therefore are also *about* the objects signified by these legisigns, it would seem that real-object-sentences which are likewise *about* objects should also be translatable into *the formal mode of speech*.   And as a matter of fact they are.   As an example of a real-object-sentence, Carnap offers :

S3 : The rose is red
The translation into the formal mode is as follows :

S4 : " The word ' rose ' is a thing-word and the word ' red ' is a color-word and the latter is predicable of the former "

Carnap contends that the sentence S1 " The rose is a thing " is not about the rose but only about the word ' rose.'   His reason is that it can be translated into the formal mode of speech by S2.   Hence he will have to maintain that S3 : " The rose is red " is not about the rose but only about the word ' rose ' since it can be translated into *the formal mode of speech* by S4.

3. The following illustration employed by Carnap will show clearly that he has confused the *sinsign* with the *legisign*. Quoting from Carnap :

" To take a more striking example, suppose we have a geographical book about Africa and we make the statement : " This book treats of Africa."   Then this sentence (3b) belongs to the material mode ; the corresponding sentence of the formal mode is : " This book contains the word 'Africa' " (3c).   The sentence 3b is in its form analogous to the sentence

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[5] " A Rhematic Symbol or Symbolic Rheme is a sign connected with its Object by an association of general ideas in such a way that its Replica calls up an image in the mind which image, owing to certain habits or dispositions of that mind, tends to produce a general concept, and the Replica is interpreted as a Sign of an Object that is an instance of that concept."   Peirce, *Collected Papers*, 2.261.

" Mr. A visited Africa " (3a) ; but there is a principal differ-
ence between the two sentences. The sentence 3a asserts
something about Africa. The sentence 3b being analogous
seems to assert something about Africa, but really *does not*. It
is not a quality of Africa to be treated of in that book, because
one might know everything about Africa and nevertheless
nothing about that book. It is only a quality of the word
' Africa ' to be contained in the book. On the other hand, it
is really a quality of Africa to be visited by Mr. A."

Here Carnap's failure to distinguish the sinsign from the legi-
sign leads him to raise a metaphysical issue, the problem of
external and internal relations, and in order to defend his position
he takes sides on that question. He can give no good reason
for believing that it is not a quality of Africa to be treated of in
that book, while it is a quality of Africa to be visited by Mr. A.
Certainly students of geography who are students *about* Africa
would disagree with him, if the book were a good one and Mr.
A's visit a brief one. According to Carnap sentence 3c means :
" This book contains the *sinsign* ' Africa ' " ; as we have already
seen, as such, it is an incorrect translation of 3b. The correct
translation would contain the legisign ' Africa ' and would
therefore refer to Africa.

As a final example let us consider the statement : " Numbers
are classes of classes ". This statement seems to concern
certain ' things ' called numbers and is under the serious dis-
advantage that it might lead curious metaphysicians to ask
questions concerning the ontological status of these numbers.
We should therefore formalize it ; it then becomes " Numerical
expressions are class-expressions of the second order ". Carnap
believes that this rendition should silence the metaphysicians,
though I do not see, if they are the persistent kind, why they
could not ask : What do these numerical expressions stand for ?
Do they signify things, or thoughts ? Or are they mere words ?
These questions are every bit as unpleasant as if they had asked,
concerning the statement in the material mode of speech, whether
numbers are real or ideal, intra-mental or extra-mental. So that
I think the advantage claimed by Carnap for the formal mode of

speech, that it discourages meaningless questions is a spurious one. But when Carnap contends that the mathematician does not deal with numbers at all, but only with certain syntactical expressions,[6] he seems to me dangerously close to the nominalistic door of the epistemological trap he wishes especially to avoid.[7] At any rate, sentences containing numerical expressions are not always *about* these expressions, but often about what they signify. That is to say, the numerical expressions may function as legisigns, not as sinsigns. It is the objects signified that we say are odd or even, prime or composite, rational or irrational. Thus, when we assert : for all integral values of n, $2n$-1 *is* an odd number, the " is " is a different symbol from the " is " in "a circle *is* a plane figure." The former "is" might be called the " is " of *signification*, while the latter " is " is, of course, the " is " of class membership.

I believe the distinction between sinsign and legisign can help to solve the problem concerning the meaning of " about", which is discussed in this journal by Mr. G. Ryle (Vol. 1, No. 1, " ' About ' ") and by Mr. Ross Thalheimer (Vol. 3, No. 3, " More About ' About ' "). The word " about " may have two meanings in the occurrence " This sentence is about K ", depending on the nature of K. A sentence S1 containing a sign K_L functioning as a legisign is said to be *about* the object signified by such a sign. But if the sentence S2 contains a sign K_S functioning as a sinsign, we say it is *about* the sign, not about the object. For example, S1 " Cæsar is ambitious " is about the man Cæsar, not about the name " Cæsar ". But S2 : " ' Cæsar ' is a Roman name " is about the name ' Cæsar ', ; it says nothing *about* Cæsar, the man. Mr. Ryle was concerned with sentences containing sinsigns, Mr. Thalheimer with sentences containing legisigns.

The main point I have been trying to make is one that has been repeatedly emphasized by many logicians, especially C. S.

[6] Philosophy and Logical Syntax, p. 79 : " If we use the formal mode of speech, we are not speaking about numbers, but about numerical expressions."

[7] The other advantage mentioned by Carnap, that the formal mode of speech helps to show the relativity of philosophical theses to a language system is, I believe, a genuine one, but this does not do away with the problem, as Carnap seems to maintain, of choosing an *adequate* language system.

Peirce and J. Royce. Symbolizing is a triadic relation between symbol, object, and a system of reference which enables us to interpret a given symbol as referring to a certain object. The formal mode of speech is valuable because it clarifies the structure of discourse, and refers ideas to a context which alone shows their significance. But the reference to objects is inherent in the nature of symbols. To be sure, the purpose of logical syntax is not to investigate the ontological status of the objects, but to analyse symbolic expressions. But the reference to objects cannot be avoided ; it is implicit, for example, every time we judge one symbolic expression to be more adequate or more appropriate than another.

New York, Feb. 1936.

EPISTEMOLOGICAL REMARKS ON THE PRO-POSITIONAL CALCULUS

By KARL BRITTON

§1 In the October number of *Mind* (Vol. XLII page 172), Dr. Willard Quine says that we *can* interpret the Theory of Deduction as a logistic " system whose elements are shapes, signs, specifically sentences." The theorems of this system (e.g. $\vdash p \supset (p \vee q)$) are sentences which tell us that any sentences of this form are truth-telling sentences. Dr. Quine gives us three reasons why we *should* so interpret the Theory of Deduction : (1) It will avoid a logistic system which is anomalous— its theorems are also elements. (2) It will " clear away useless lumber." (3) It will enable us to answer the question : When do two sentences mean the same proposition ? We shall find that this question " comes to admit of one or another definite answer in terms of geometrical similarity or conventional correspondence of written marks."

§2 I suggest that we *can* similarly interpret all definitions and a priori analytical propositions ; and that there are good reasons (including Dr. Quine's last two reasons, and others) why we *should* adopt this interpretation.[1] This I hope to show in the following epistemological remarks ; and I also hope to show the peculiar part played by the sentences which ' express theorems in the system ' or ' provide definitions ' or ' express a priori analytical propositions.'

§3 To give definitions, and to express propositions more clearly, is a principal part of philosophy.[2] That is to say, in some sense of the word ' meaning ', it is true to say that philosophers are concerned to express clearly the meaning of certain words and sentences. And similarly, in the Analysis of Propositions, we begin with one sentence and end with another, and then assert that both sentences mean the same proposition. Philosophers must be interested to know when two sentences mean the same proposition.

[1] Cf. Rudolf Carnap : Philosophy and Logical Syntax, II, 2, etc.
[2] F. P. Ramsey : Foundations of Mathematics pp. 263–9.

§4 I observe (for example) that I connect the word " dappled " with a certain class of objects (including certain horses, cloudy skies, kinds of cloth).   But this is not a simple dyadic relation. I am *myself* somehow a third term in the relation.   It is in my mind that " dappled " is associated with certain objects : there must be a mental image, or a disposition of mine, as a constituent in the fact.

§5 I also observe that other Englishmen and Americans *understand* the word " dappled." (If I say : " I am going to ride the dappled mare," my companion obligingly takes the roan).   Here again we have a triadic relation of meaning : " dappled " means a class of objects (including the horse) to certain people.   Now the test of understanding and of meaning, is behaviouristic.   I know nothing of the secrets of my friend's heart, except in so far as I interpret his behaviour.   We have here, then, a different triadic relation : the third term does not include images, dispositions, etc. ; it includes the behaviour of other people in reference to the token-words of the type " dappled ", and to the class of dappled objects.

§6 Now in the *first* sense of " meaning " (§4), I can speak only of the way in which signs mean for me.   But in the second sense of " meaning ", (§5) I can say that a sign means a certain class of objects to certain people other than myself.   But any such statement about the second sense of " meaning " is an empirical proposition.   It states what I observe on a particular occasion in my experience.   And if I make any general state-ment, such as : " The sign ' dappled ' always means a certain class of objects for a person A," this will be nothing more than a probable inference from my limited experience of A's behaviour.

§7 Suppose I offer the definition :

" Dappled means having grey circles on a white ground." It is clear that I am not intending to say something merely about the way in which signs mean for me.   For I do imply that whoever uses the word, means (or ought to mean) by that word, what I say it means.   Hence my definition is not about meaning in the first sense of the word.

§8 It seems equally clear to me, that in giving such a definition, I am not making an empirical generalisation about the way in which English people behave in reference to the word " dappled " and the class of dappled objects. For surely I offer definitions of words used by people whose behaviour I have never observed or wished to observe ; and surely a definition is not an empirical generalisation about anything.

§9 It seems to follow that when I give a definition of a word, I am giving the *meaning* of the word in still a *third* sense of the word " meaning ". When I give a definition, or analyse a proposition, I am interested only in the use of words, and not at all in any *other* kind of behaviour.[3] This suggests that the meaning I give is some relation between signs themselves. Now I can judge how people use words, even when I have never seen or heard the people—I can read their writings. Can it be that a definition such as that of " dappled ", is really an account of the way in which English people, and American people, do *in fact* use the signs " dappled " and " having grey circles on a white ground " ?

§10 This cannot be the case. For a definition is not proved true, if people happen to follow it, nor is it falsified if they happen to neglect it. (In giving a definition I commonly also claim that people do in fact use words in this way : this added assertion is not to be confused with a regulative definition).[4] I conclude that a definition says how people *ought* to use words in relation to one another (not to other objects). (This is clearly a hypothetical, and not a categorical imperative !) Like commands, such propositions are not true or false : they are *a priori*.

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[3] Hence a definition is not a proposition about the way in which people *ought* to behave in reference to the word defined and the objects it applies to. And clearly there is no way of conveying which class of objects is in question, except by using its name. But this *tells us nothing,* for " People ought to call a kettle ' a kettle ' " means only : " What ought to be called ' a kettle ', ought to be called ' a kettle ' ". *Contrast* our identification of the *sign types* that are in question : §20 below.

[4] But the fact that people *do* use words in a certain way may be part of the reason why people ought to use words in that way.

§11 We may therefore re-express our definition as follows :

The word " dappled " and the words " having grey circles on a white ground " ought to be substitutable one for the other.

Similarly, a proposition asserting the analysis of another proposition, may be written :

The sign " *p* " and the signs " *qrs* " ought to be substitutable one for the other.

And an a priori Analytical Proposition clearly belongs to the same family. " All white swans are white " may be written :

The sign " white " ought to be substitutable for the sign " white swans.' (But not vice versa).

So all definitions and all a priori analytical propositions are assertions about the way signs ought to be used in relation to each other. And the *third* sense of the word " meaning " is just "the rules governing the use of signs with respect to each other."

§12 A definition such as that of " dappled " is simply about the proper use of " dappled " : but an a priori analytical proposition really tells us about the proper use of the words " and ", " or ", " nor ", " If—then " etc., as well as about the proper use of the other signs in the sentence. We can regard such a proposition, then, as being a *clumsy* way of telling us the rules about the logical constants. It is clumsy simply because it introduces signs which do not at all affect the proper use of the logical constants. The information could be given much more simply by the use of signs whose meaning (in the third sense of that word) is ambiguous. We can express a rule about the way " or " ought to be used, for example, by writing :

" *p* or *q* " ought to be substitutable for " *q* or *p* " and vice-versa.

Here the signs " *p* " and " *q* " are not themselves subject to any rules other than those actually involved in the calculus : they do not, therefore, distract our attention from the rules about the logical constants.

§13 Here then, we have Dr. Quine's Theory of Deduction interpreted as a calculus (a set of rules, or ' ought-propositions ') for the interposition of " not " " and ", " or ", etc. amongst any sentences. The elements of the system are sentences about which we know no more than that they are truth-telling or not truth-telling : this is ensured by the calculus itself.

§14 Such an interpretation clears away as " useless lumber ", at least two senses of the word " meaning ". For the calculus gives the meaning of the logical constants only in my third sense of that word. We do not ask whether the elements or the semantic operations have meaning in my first or second sense. I hope that the preceding paragraphs have adduced reasons for *not* asking this question. This is not, of course, to deny that the other senses of " meaning " are important for extralogical purposes.[5]

§15 Such an interpretation answers the question : " When do two sentences mean the same proposition ? " only in my third sense of " meaning ". For " p " and " q " will mean the same when they ought to be mutually substitutable. The questions about when two sentences mean the same to me (in the first sense) and when they evoke the same response in people generally, are not answered.

§16 If we adopt this interpretation of the Theory of Deduction and of a priori analytical propositions and of definitions, we shall (Dr. Quine points out) be using our variables, and our sign-definiendum in a rather peculiar way. In the calculus of sentences (the Theory of Deduction), the signs " p ", " q " etc are names for sentences of certain sorts; and the sign " $p \supset (q \vee r)$ " (not asserted) is a name for sentences of a more complex sort. Similarly, in my definition, the sign " dappled " occurs as *a name for a word*.

§17 This is Dr. Quine's view, and I think it is *approximately*

[5] Compare : C. S. Peirce, ' Chance, Love and Logic ' (1st two papers) for a discussion of my second sense of " meaning " ; and F. P. Ramsey (loc. cit. p. 144) on my first sense of " meaning ".

correct.[6] " p ", " q ", " dappled " etc are (let us say) names for *sign-types*. In my definition of " dappled ", the sign " dappled " is present to denote a word-type and not (as is usually the case when the word is not enclosed in quotation marks) to denote dappled objects such as horses.

§18 Amongst the objects in the world are dappled objects and tokens of the word-type " dappled ". To talk about dappled objects I use a purely conventional sign, tag or label ; but to talk about the latter I take the extraordinary step of producing a member of the class, to be used as a sign for the whole class. I might have used the sign " x " or " y ", to denote the word-type in question ; but invariably I use the sign (" dappled ")—a sign-type used as a sign for itself.

§19 In this extraordinary procedure lies the whole *virtue* of talking about my third sense of " meaning " ; of analysing propositions instead of discussing our private worlds ; of interpreting the Theory of Deduction in the way suggested by Dr. Quine. In talking about the way in which signs ought to be used, we are talking about objects in the world—words and sentences. But these objects are actually represented on paper in what might very well be called *illustrations in the text*.[7] These illustrations,

e.g. " dappled ", " having grey circles on a white ground ",

" $p \supset (p \vee q)$ "

can be regarded as providing us with a pictorial description of the kind of object under consideration. We might then, re-express the necessary proposition :

$$p \supset (p \vee q)$$

as : " Any sign that looks like *this* (in the illustration) is a truth-telling sign."

[6] Compare §19 below.

[7] Dr. Quine writes of " depicting the use of the connectives ' or ', ' If—then——' etc.," but he is not here actually writing of the interpretation of the Theory of Deduction here under discussion.

On this interpretation, the sign that follows the " $\supset$ " is not really a *name*, but is an element in a *description* of a sign-type.[a]

§20 This illustrative function is important. In analysis, and in the Theory of Deduction, we want to talk about the meaning of signs, without pretending to know what signs *mean*, in my first two senses of " meaning ". And certainly we can assert or understand these " ought-propositions " or rules, without knowing the *meaning* (in the first two senses) of the sign-types under discussion (i.e. of the sign-types whose tokens occur as *illustrations*). We do not (for example) need to know how any-one feels about the word " dappled " ; how people react towards its use. We need to know only how the word ought to be used in relation to other words. For the assertion of such a rule, we must identify the sign-types being discussed ; and the illustrations are essential for making this identification. But *of course* the whole sentence that expresses such a rule of language is itself just like any other sentence so far as its *meaning* is concerned. It is itself an object in my sensible world ; it has a certain meaning for me (in the first sense of " meaning ") ; and it affects people's behaviour in ways open to my observation. All this is obvious ; and it is also obvious that such considerations are outside the proper scope of logistic.
Aberystwyth.

[a] I dare say it is often thought that such a description is entirely unambiguous ; but, as Dr. Wittgenstein insists, all symbolism is intrinsically ambiguous.
Cf. A. N. Whitehead, " Symbolism " pages 7 and 8.

MISCELLANEOUS NOTES

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